Order Number 1345439

Effects of sedative music on the respiratory status of clients with chronic obstructive airways diseases

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The University of Arizona, 1991

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EFFECTS OF SEDATIVE MUSIC ON THE RESPIRATORY STATUS OF CLIENTS WITH CHRONIC OBSTRUCTIVE AIRWAYS DISEASES

by

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A Thesis Submitted to the Faculty of the
COLLEGE OF NURSING

In Partial Fulfillment of the Requirements
for the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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ACKNOWLEDGEMENTS

Thank you to my mother, sister and brother for their continuous support, encouragement and love. Thank you to my committee members: Dr. Leonna Crosby for helping me properly focus this study and Ms Gail Traver for facilitating data collection. A special thank you to Dr. Ann Woodtli for her support, guidance and friendship. Thanks to Dr. Mary Lynn for her assistance in statistical analysis, and to the LRC staff for their technical help. Finally, a grateful thank you to the nurses, staff and clients at the Pulmonary Clinic.

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ABSTRACT

A quasi-experimental, pre-test post-test study was conducted to examine the effects of sedative music on the perception of dyspnea intensity, respiratory rate, pulse rate and oxy-hemoglobin saturation level of clients with Chronic Obstructive Airway Diseases (COAD).

Data was collected on a convenience sample of ten subjects who acted as their own control. After a six minute walk, each subject was randomly exposed to a treatment (listening to music for 20 minutes) and to a control (resting for 20 minutes) situation.

A series of paired t-tests was performed to analyze the data. Results indicated that the mean pulse rate and mean respiratory rate were significantly lower after listening to music than after resting only. Correlational analysis indicated that dyspnea perception is positively coerelated with pulse and respiratory rates and negatively correlated with oxygen saturation. Encouraging clients with COAD to listen to music is a supplemental nursing intervention aiming at reducing the intensity of dyspnea perception, pulse and respiratory rates.

CHAPTER ONE

INTRODUCTION

The prevalence of Chronic Obstructive Airway Diseases (COAD) in the United States has increased from eight million in 1970 to 18 million in 1988. Smoking, environmental and occupational pollutants are factors that have an impact on the occurrence of COAD (Burrows, 1981; Jarvis, 1981; Shenkman, 1985; Carrieri & Janson-Bjerklie, 1986a; McVan, 1989). The large number of people with COAD, and the nature and consequences of the compromised respiratory function in affected individuals present a major health problem. Clients with COAD face long-term disabilities requiring a comprehensive approach to their health care which is a challenge to nurses. Nurses provide care to clients with COAD during their convalescence or rehabilitation period and/or during acute exacerbations requiring hospitalization. In either situation, COAD clients' chief complaint is dyspnea defined as shortness of breath or difficult breathing. Alleviating the respiratory symptom of dyspnea by implementing appropriate interventions is a primary aspect of the nursing care offered to clients with COAD. The focus of this study is to determine the effectiveness of a nursing intervention in reducing the severity of dyspnea reported by COAD clients.

Shortness of breath, frequently reported by COAD clients (Wanner & Sackner, 1983, p. 114), usually leads to alteration in the physical, psychological and social aspects of the client's well being thus influencing daily activities and relationships (Kaplan & Atkins, 1988). Other pathophysiological changes associated with COAD result in hypoxemia, tachycardia, generalized fatigue and weakness.

Dyspnea is a major symptom experienced by clients with COAD (Sandhu, 1986); it occurs with physical activity or exercise, with increased airway resistance and with periods of strong emotions (Dudley, Martin & Holmes, 1968; Rosser & Guz, 1981). Findings of several studies showed that the sensation of dyspnea is individually perceived (Burki, 1980). Moreover, it has been demonstrated that improvement in the clinical condition of COAD clients is positively correlated with their psychological state (Agle, Baum, Chester & Wendt, 1973; Sahn, Nett & Petty, 1980). These findings support the belief that the psychological status of the individual influences the perception of dyspnea. Dyspnea is also accompanied by changes in the respiratory pattern (Lareau & Larson, 1987, p. 181) and in cardiovascular functioning (Burki, 1980; Altose & Cherniack, 1985).

Nurses are increasingly aware of and acknowledge the severity and chronicity of the symptoms of the clients with COAD. Nurses play an important role in helping clients to alleviate the symptoms experienced and to cope with their disabilities. Recognizing that dyspnea interferes with the COAD client's level of physical and psychological well being, therapeutic interventions aimed at reducing psychological discomfort and at improving cardiopulmonary impairment associated with dyspnea have been investigated. Psychological support, breathing retraining or breathing exercises, slowing and regularizing breathing, relaxation training such as progressive relaxation, and biofeedback have been used effectively to alleviate generalized fear and apprehension associated with dyspnea (Dudley, Glaser, Jorgenson & Logan, 1980; Foote, Sexton & Pawlik, 1986; Sandhu, 1986; Renfroe, 1988). Carrieri & Janson-Bjerklie (1986) found that 28% of COPD subjects "attempted to calm down" or to relax, while others "choose to distract" themselves through "playing with children, watching TV or covering their ears so that they do not hear the wheezing" (p. 293). Several investigations demonstrated that calm music had a relaxing effect on the listener (Bonny, 1983; Cook, 1986; Moss, 1988; Mullooly, Levin & Fieldman, 1988; Zimmerman, Pierson & Marker, 1988).

Listening to music has been shown to reduce psychological tension and to affect the respiratory function of clients with compromised pulmonary function (Metera, Metera & Warwas, 1975b). Research findings indicate that pulse rate decreases and oxygen saturation improves with music. Nurses can help clients with COAD cope with dyspnea and assist them in breathing regularly and slowly by instructing them to listen to sedative music.

Statement of the Problem

It is known that the psychological condition of the individual influences the perception of the intensity of dyspnea (Dudley & Sitzman, 1988). Therapeutic interventions such as progressive muscle relaxation, biofeedback and cognitive training have been implemented to improve the subjective feelings of the individual with COAD and have resulted in decreased oxygen consumption, respiratory rate and volume (Kolkmier, 1989). Although relaxation measures are successful in positively influencing the physiological and psychological parameters associated with tension and dyspnea (Bailey, 1983; Bonny, 1983; Renfroe, 1988), they require special instructions to be given and daily practice sessions (Clark, 1986). In addition, Reinking & Kohl (1975) found that the effect of relaxation is "weak and hard to produce" (p. 592). Alternative interventions are needed.

Sedative music is currently believed to relieve anxiety and tension. Hudson (1973) referred to music as a psychological language "capable of bridging the gap between the language of physiology and the language of consciousness" (p. 139). Music has the power of diversion, the capacity to modify mood, the ability to command attention, as well as the capacity to produce changes in metabolism, respiration, blood pressure and pulse (Podolsky, 1945). In addition, listening to music has been found to alleviate discomfort associated with physical illness and hospitalization (Zimmerman, et. al., 1988; Zimmerman, Pozehl, Duncan & Schmidt, 1989; Bonny, 1983; Bailey, 1983); to divert attention from unpleasant internal and/or external stimuli such as pain (Clark, McCorkle & Williams, 1981; Locsin, 1981; Bonny & McCarron, 1984; Updike & Charles, 1987; Moss, 1988; Mullooly, et. al., 1988) and to influence respiration (Metera, Metera & Warwas, 1975b).

In the client with COAD, listening to sedative music seems to be a promising intervention to produce a state of relaxation in which the heart rate is decelerated, breathing is regulated and oxygen consumption is decreased. Consequently, music can be considered a therapeutic intervention which nurses can use to alleviate the intensity of dyspnea perceived by clients with COAD, to decrease their respiratory and pulse rates and to reduce their oxygen consumption.

Purpose

The present study was designed to investigate the effect of music on the respiratory status of clients with COAD. Of special interest was the client's subjective perception of the intensity of dyspnea as well as changes in the physiological correlates of dyspnea. More specifically, the purposes of this study were to: (1) determine the effects of sedative music on the perception of the intensity of dyspnea, respiratory rate, pulse rate, and arterial oxyhemoglobin saturation level of clients with COAD living in the community, and (2) determine the relationship, if any, between the physiological correlates of dyspnea, namely the respiratory rate, pulse rate, and arterial oxygen saturation, and the subjective perception of dyspnea.

Theoretical Framework

This study was based on concepts of general systems theory. According to general systems theory, each human being is viewed as an open system interacting with the environment. The open system is composed of subsystems, is delineated by a boundary and functions as a whole to maintain a steady state (Riehl & Roy, 1980; Fawcett, 1984).

The open system is in constant interchange with the environment through receiving (input), processing, and sending back information (output) to the environment. A feedback loop is thus established (Yura & Walsh, 1978).

From a nursing perspective, person and nursing are perceived as independent yet interactive systems, and are part of a larger suprasystem, the environment. The aim of the person-nursing interaction is to maintain health.

From a system perspective, person is a whole, unified, unique, open system composed of physiological, psychological, social and spiritual subunits. The units are interrelated, in constant, dynamic and reciprocal interaction. Illness is considered an external or internal disturbance affecting the composition of man and resulting in disequilibrium. The physiological and psychological subsystems of the person in disequilibrium are of concern to this study, specifically clients with COAD who experience impaired respiratory functioning. Alteration in the respiratory status is subjectively perceived by the COAD client as dyspnea and is objectively observed by the nurse as changes in pulse rate, respiratory rate and oxygen saturation. This physiologic disturbance is sensed by the COAD client as dyspnea. Although physiological changes occur in COAD clients, dyspnea is not reported unless the client perceives it as threatening. The emotional state and individual characteristics of the person influence the perception of dyspnea (Traver, 1988). In addition, the perceived intensity of dyspnea affects the physiologic parameters of respiratory rate, pulse rate and arterial oxygen saturation. The COAD client, functioning as a person, is an open system and responds to the environment through physiological and psychological alterations.

Nursing as an open system in the client's environment, interacts with the person for the purpose of maintaining equilibrium. Nurses manipulate the client's environment, aiming at improving the psychological and the physiological status of the client and restoring equilibrium. More specifically, the provision of sedative music by the nurse may help the tense client perceive the situation as less stressful or less threatening which would enable him/her to cope more effectively, specially with difficult breathing (Weinberger, Schwartz & Davidson, 1979). Therefore, the nurse, functioning as a person and an open system, is able to influence the environment of the COAD client and interacts with him/her in order to assist in the restoration of adequate respiratory function.

Health is defined as homeostasis or proper functioning of the system's subparts (Yura & Walsh, 1978). Health is viewed as the ultimate goal of the nursing interaction with the client and is demonstrated by improvement in the client's physiological and psychological conditions. In this study, health is represented as an outcome variable and is measured by positive changes in the client's respiratory rate, pulse rate, arterial oxygen saturation and in the dyspnea scale score. Proper functioning of the client's physiological and psychological subunits is restored.

Environment includes all the forces, objects and persons outside the system (Marriner, 1986). In the present study, the client's interaction with the auditory environment, namely music or rhythmic sounds (Glynn, 1986), is included. By listening to sedative music, the client interacts with the environment; both the psychological and physiological status of the client are affected. Music provides the link between the parts of a system, letting them function in "harmony" (Kenny, 1985, p. 6).

The relationship among the research variables is depicted in Figure 1. Clients with COAD face a disruption in their functioning manifested by dyspnea and by physiological changes. Disequilibrium is experienced. The client and nurse, acting as open systems, interact in the environment. The nurse allows or instructs the client to listen to sedative music. The nurse-client interaction results in equilibrium or homeostasis whereby the COAD client perceives less severe dyspnea and the respiratory

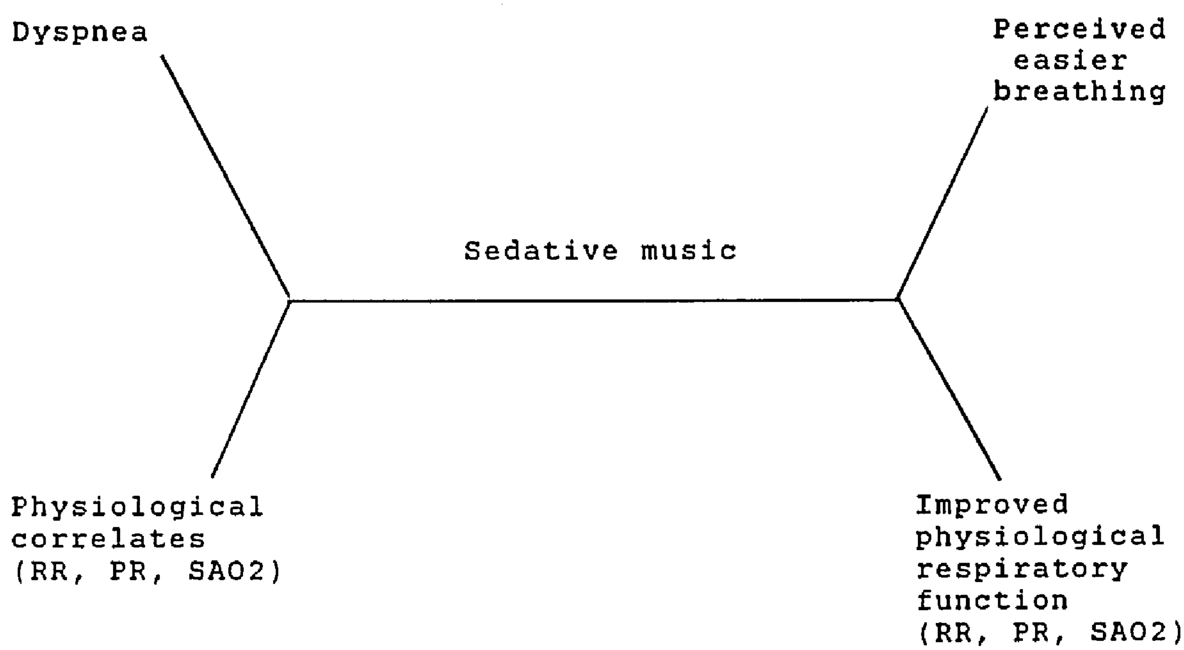


Figure 1: Relationships among the research variables.

rate, pulse rate and oxygen saturation are positively changed.

Hypotheses

The purpose of this investigation was to test the following hypotheses:

1- The COAD subjects' perception of dyspnea will be significantly less after resting while listening to sedative music for 20 minutes than the same subjects' perception of dyspnea after resting for 20 minutes without sedative music.

2- The COAD subjects' pulse rate will be significantly less after resting while listening to sedative music for 20 minutes than the same subjects' pulse rate after resting for 20 minutes without sedative music.

3- The COAD subjects' respiratory rate will be significantly less after resting while listening to sedative music than the same subjects' respiratory rate after resting for 20 minutes without sedative music.

4- The COAD subjects' arterial oxy-hemoglobin saturation level will be significantly higher after resting while listening to sedative music for 20 minutes than the same subjects' arterial oxy-hemoglobin saturation level after resting for 20 minutes without sedative music.

5- There will be a statistically significant positive correlation between the perceived intensity of dyspnea by subjects with COAD and the subjects' respiratory rate.

6- There will be a statistically significant positive correlation between the perceived intensity of dyspnea by subjects with COAD and the subjects' pulse rate.

7- There will be a statistically significant negative correlation between the perceived intensity of dyspnea by subjects with COAD and the subjects' arterial oxy-hemoglobin saturation level.

Definition of Terms

The independent and dependent research variables for this study were defined as follows :

1- The independent variable was "listening to sedative music". For the purpose of the current study, music is defined as "sounds or notes which have pitch, intensity, timbre and duration". These notes are combined in patterns which have rhythm, tempo, melody and harmony (Licht, 1946, p. 17). Sedative music is described as soothing, calm, and relaxing music. The music which subjects in this study listened to was an instrumental low tempo music entitled "Christofori's dream", by David Lanz.

2- The dependent variable was "dyspnea". Dyspnea is defined as "abnormal or disordered breathing" (Burki, 1980, p. 48). The term dyspnea is used interchangeably with shortness of breath or breathlessness or difficult breathing (Altose, 1985). For this study, dyspnea was subjectively measured by a dyspnea rating scale. The objective measurements of respiratory rate, pulse rate and arterial oxygen saturation were considered the physiologic correlates of dyspnea. The respiratory rate is equivalent to the number of respirations per minute (Potter & Perry, 1987, p. 200) as measured by the nurse. Pulse rate is the number of beating or throbbing of the arteries caused by pressure of the blood passing through the artery with contractions of the heart, in one minute (Ganong, 1987). Pulse rate was peripherally measured by a pulse oximeter. The arterial oxygen saturation measurement is the ratio of the actual oxygen content of the hemoglobin compared to the maximum oxygen carrying capacity of the hemoglobin (Fischbach, 1984, p. 740). In this study, the percent of arterial oxygen saturation was measured by a pulse oximeter.

Significance of the Problem

With the increasing cost of health services and with the implementation of the Diagnosis Related Groups (DRG), clients are often hospitalized for acute illnesses for a short period of time. Therefore, more emphasis is placed on community management of the client.

Due to the nature of the illness, obstructive airway diseases can not be completely cured. Clients are cared for on a long-term out-patient basis. Kaplan, Reis and Atkins (1985) report that respiratory diseases are generally considered to be of greater importance as causes of disability and ill health than as causes of death.

Treatment programs have been planned to provide necessary physical care and psychological support to COAD clients living in the community. The health care provider's first consideration in treatment is: "to reduce the patient's physical discomfort and disability, improve his sense of well being and teach him self-treatment techniques" (Dudley, et. al., 1980a, p. 414). More specific treatment goals are to help the client accept breathlessness without panic (Feldman, 1982, p. 335), and to help the client gain control of the expiratory rate and breathing patterns (Gorrige-Moore, 1982, p. 369), thus reducing dyspnea.

It has been established that listening to music relieves tension and with it, the sensation of dyspnea can be expected to be reduced. Listening to music is a an intervention that most clients enjoy; it is easy to learn and to implement, and has fairly rapid effects on the client (Metera, et. al., 1975a). Listening to music is a self-initiated technique that the nurse uses to assist the clients with COAD in dealing more effectively and efficiently with dyspnea. Nurses in respiratory treatment programs are in a unique position to recognize tense dyspneic COAD clients who may not be able to cope with their feeling of discomfort and to control their breathing pattern. Nurses can encourage them to listen to sedative music when they are dyspneic. This nursing intervention may result in reducing the COAD client's perception of the intensity of dyspnea, and maintaining the COAD client's respiratory pattern, pulse rate and oxygen saturation level within acceptable range.

Summary

Dyspnea is a symptom commonly reported by COAD clients. Therapeutic interventions aimed at reducing the sensation of breathlessness help improve the physiological and psychological status of the COAD clients. Based on the general system theory, this study was concerned with determining the effects of sedative music on the subjective perception of dyspnea and on the objective measurements of respiratory rate, pulse rate and arterial oxygen saturation of COAD clients.

CHAPTER TWO

REVIEW OF THE LITERATURE

In this chapter, a review of the literature related to the sensation of dyspnea and effects of music is presented.

Dyspnea

Dyspnea is viewed as a sensation evoked by the perception of sensory stimuli (Altose, 1985). Perception involves the integration of sensory input by the central nervous system and is affected by the personal characteristics of the individual, including previous experience and learning (Killian, 1985). Consequently, the sensation of dyspnea involves the interaction of physiologic, biochemical and psychologic components (Lareau & Larson, 1987).

Pathophysiology of Dyspnea

Although there is no conclusive, unifying theory explaining the pathophysiology of dyspnea, several hypotheses have been suggested. Carrieri, Janson-Bjerklie & Jacobs (1984) stated that dyspnea is related to the imbalance between "respiratory reserve" and "maximum breathing capacity" (p. 437); dyspnea occurs when a specific individual level of ventilation is exceeded, such as with exercise. A second explanation is related to increased airway resistance and/or change in lung or chest wall elasticity that require the respiratory muscles to work at a greater force in order to achieve a given level of ventilation. Dyspnea is sensed when decreased energy supply to the inspiratory muscles leads to muscle fatigue and inadequate functioning (Altose, 1985). A third explanation is related to length-tension inappropriateness in which the amount of tension developed in the inspiratory muscles and the expansion of the chest is less than expected (Macklem, 1986). Finally, dyspnea has been related to stimulation of chemoreceptors in the carotid and aortic bodies and in the brain; to stimulation of mechanoreceptor in the airways, lung, chest wall; and to stimulation of proprioceptor in skeletal and respiratory muscles (Burki, 1980; Carrieri & Janson-Bjerklie, 1986a).

Correlates of Dyspnea

Dyspnea is frequently manifested by an increased respiratory rate, described as rapid shallow breathing (Carrieri & Janson-Bjerklie, 1986; Gift, Plaut & Jacox, 1986; Lareau & Larson, 1987). Although no references in the literature were found that identified pulse rate and oxygen saturation as direct measurements of breathlessness, it is currently believed that these two variables are consequences of the altered respiratory pattern observed during episodes of difficult breathing (Kozier, Erb & Buffalino, 1989; Kim, McFarland & McLane, 1987). Several mechanisms have been suggested as explanation for the occurrence of tachycardia with dyspnea. First, when dyspnea is manifested by rapid shallow breathing, the work of the respiratory muscles is increased demanding a constant supply of oxygen; heart rate is accelerated to meet these demands (Shapiro, Harrison, Kacmarek & Cane, 1985). Secondly, with increased ventilatory frequency, the tidal volume decreases and the alveolar ventilation is reduced (Ganong, 1987); the alveolar and consequently arterial oxygen tensions are affected, resulting in hypoxemia (Reischman, 1988). Third, when dyspnea is associated with hypoventilation, hypoxemia results (Carrieri & Janson-Bjerklie, 1986). Four, hypoxemia is followed by tachycardia to maintain adequate oxygen delivery to the body (Ganong, 1987). An alternative explanation is that tachycardia may be explained by the fact that dyspnea initiates a feeling of suffocation leading to anxiety. Anxiety stimulates the autonomic nervous system and increased heart rate is observed (Dudley, et. al., 1980a).

Dyspnea may be accompanied by altered respiratory pattern and hypoxemia. Oxygen saturation is considered a reflection of the state of hypoxemia (Taylor & Whitman, 1986; Tobin, 1988) In a study conducted to evaluate changes in pulmonary mechanics in acute hypoxia or acute hypercapnia, Parsons, Grunstein and Fernandez (1989) found that oxygen saturation measurement and lung resistance were negatively related, with a correlation coefficient $r = -0.81$; resistance was decreased when dyspnea occurred. Increased resistance is usually associated with the sensation of dyspnea.

Dyspnea in COAD

Airway obstruction and hyperinflation characterize the respiratory status of COAD clients. Airway obstruction leads to increased airway resistance with consequent increased work of breathing that leads to respiratory muscle fatigue in severe cases. Muscle fatigue is aggravated by exercise (Gottfried, Altose, Kelsen & Cherniack, 1981). Hyperinflation shortens inspiratory muscle fiber length which decreases muscle strength (Macklem, 1986). The altered respiratory pattern may result in carbon dioxide retention accompanied by decreased blood oxygen tension and increased hydrogen ion concentration. These chemical changes may stimulate peripheral and central chemoreceptor that result in the efferent response of increased ventilation which is not well tolerated by COAD clients (Shapiro,Harrison, Cane & Templin, 1989).

The Psychology of Dyspnea Perception

The sensation of dyspnea is subjectively perceived by individuals, and is affected by cognitive, contextual and affective factors (Altose, Cherniack & Fishman, 1985). Stimulus duration, stimulus frequency, the number of receptors stimulated and the state of adaptation of the subject influence the magnitude of dyspnea (Killian,1985). Gottfried, et. al. (1981), performed pulmonary function and psychophysical tests on 29 healthy and 14 COPD subjects and concluded that the factors determining the subjective magnitude of the sensation of airway resistance are unclear. However, the small sample size, the unequal number of subjects in the two groups studied and the difference in the mean age of the subjects in the two groups weakened the design of the study and limited the generalization of the findings. Similarly, Janson-Bjerklie, Ruma, Stulbarg and Carrieri (1987) conducted a quasi-experimental study to identify variables that predicted the intensity of dyspnea in 30 asthmatic subjects. Ratings of dyspnea intensity on a visual analogue scale were obtained at baseline and when bronchoconstriction was induced. Correlational analysis showed that the magnitude of dyspnea was not related to airway resistance and that subjects with greater dyspnea at baseline experienced greater dyspnea during bronchoconstriction.

Psychological or emotional status has been suggested as a factor that may explain the individual variation in reporting dyspnea. Dales, Spitzer, Schechter and Suissa

(1989) surveyed 600 healthy subjects and examined the relationship between reported respiratory and psychiatric symptoms. The results showed that subjects with psychological disturbance (anxiety, depression, anger) reported more respiratory symptoms (cough, phlegm, wheeze, dyspnea). Results of studies conducted by Tiller, Pain and Biddle (1987) indicated that the perception of dyspnea may decline with prolonged exposure to the stimulus and that the sensation of breathlessness does not directly depend on the amount of muscular effort performed during breathing. Gift, Plaut and Jacox (1986) investigated physical and emotional factors related to levels of dyspnea experienced by 11 hospitalized COPD patients. They found that accessory muscles were used more during episodes of high than low dyspnea but no relationship was demonstrated between dyspnea and the other physical parameters. Prescribed treatments (bronchodilator and oxygen therapy) were continued during the period of data collection and may have influenced the results. Finally, two research studies using case methodology support the finding that dyspnea is associated with emotional and physiologic changes in both healthy subjects and subjects with COPD (Dudley, Martin & Holmes, 1968; Heim, Knapp, Vachon, Globus & Nemetz, 1968).

Investigations have shown that by alleviating anxiety through relaxation techniques, less dyspnea was reported and the breathing patterns were positively changed (Carrieri, et. al., 1984). Still, Agle, et. al. (1973), reported that among the subjects participating in a rehabilitation program, those who improved (as measured by their level of physical activity) tended to have less severe symptoms of anxiety and depression.

In an experimental study, Renfroe (1988) evaluated the effect of progressive relaxation training on anxiety and dyspnea in 20 patients with COPD. Reduction in dyspnea (as reported on a visual analogue) was observed at the end of each training session and at the end of the training period: both respiratory rate and heart rate decreased significantly when relaxation was attained. Although a small sample was studied, these results support the importance of instructing COPD clients in relaxation techniques to reduce their discomfort and dyspnea.

To summarize, research findings have demonstrated that the emotional condition of a person influences the respiratory status as well as the perception of respiratory changes. However, Stoudenmire (1975) found that healthy young subjects (N=108) reported as much reduction in state anxiety after listening to soft relaxing music as after muscle relaxation training. He concluded that music can be used as a method of "temporary anxiety reduction in instances in which muscle relaxation is inappropriate" (p. 491).

Music

In fact, music has been used to treat physical and mental illness throughout history. Recent investigations demonstrated that music has physiologic and psychologic effects on human beings and is a promising intervention in a wide variety of conditions (health and illness).

The literature is very rich in research in the field of therapeutic use of music. Only those studies investigating the effects of music on the subjects' psychological tension and physiologic status are included.

Psychologic Effects of Music

Music can mobilize attention and prolong attention span (Soibelman, 1948), help in releasing and controlling emotions and in communicating or expressing feelings (Alvin, 1975). Music modifies mood by acting on the thalamus which is the main relay station of emotions and feelings (Cook, 1981). Cook (1981) demonstrated that calm soothing music decreased situational tension; exciting music created more tension than calm music; and calm music produced less anxiety than no music. Smith and Morris (1976) studied the influence of music on fear and tension aroused in 66 young healthy college students while taking a multiple choice test. Their findings showed that sedative music reduced affective arousal during the testing period, while stimulative music significantly increased worry and maintained physiologic arousal. MacClelland (1979) reviewed research studies conducted to determine the therapeutic use of music. She concluded from her research that music alleviates discomfort associated with situations such as surgical operations and dental procedures, and that familiar, soothing music characterized by slow and steady tempo are pleasant and "conducive to relaxation" (p. 257). Rohner and Miller (1980),in an experimental study with 57 healthy undergraduate students reported that familiar music has little, if any, relaxing effects and that sedative music does not increase tension. Because several variables were not controlled (subjects were tested in group; background music was played; music was played for 10 minutes only), these findings can not be generalized. Schimdt (1984) studied the relationship between the structure of a piece of music and the effects it produces. She analyzed the results of previous investigations and concluded that slow, calming music with a regular rhythm is the most effective in attracting the attention of and soothing or relaxing emotionally disturbed/hyperactive individuals, while fast and dissonant (non-rhythmical) melodies created tension. Two studies investigated the effects of sedative music on patient populations. One study investigated the effects of music on 24 subjects who underwent gynecological surgery and one on 40 cancer patients experiencing pain. Findings of these studies showed that sedative music reduced the overt reaction to pain but did not have significant effect on the perception of pain intensity or on physiological/autonomic reaction of the subjects (Locsin, 1981; Zimmerman, Pozehl, Duncan & Schimtz, 1989). However, in another study, Moss (1988) found that relaxing music alleviated pre-operative anxiety and facilitated anesthesia induction in 17 subjects undergoing elective arthroplasty.

In summary, findings of research studies as well as empirical evidence of music therapists indicate that soothing, calm, relaxing music with slow tempo, releases "physical tension" and acts as a "tranquilizer" in situational tension (Priestley, 1975, p. 253).

Physiological Effects of Music

The effects of music on many body systems has been the concern of a multitude of research studies. Studies in which the effects on the respiratory, circulatory, and muscular systems were investigated will be reviewed.

Respiratory system: Early experiments showed that fast, slow and sad music accelerated the respiratory rate, diminished the amplitude of respiration and produced irregular rhythm of respiration (Soibelman, 1948, p. 32) while music "having no emotional associations" did not change breathing patterns (Podolsky, 1945, p. 58). Ellis and Brighouse (1952) found that respiratory rate tended to increase at the onset of music and returned to normal when music ceased. Their data showed that the change in the rate is moderate with soothing music and that rate decreased in some subjects. Occasional slight reduction in the airway resistance (measured by Forced Expiratory Volume in One Second, FEV1) of patients with obstructive diseases listening to soothing music was reported by Metera et. al. (1975b). The same investigators found that soothing music decreased minute ventilation, minute oxygen consumption and basal metabolic rate in patients with resistive and obstructive pulmonary diseases. Exciting music slightly increased these parameters but no significant effect was observed on the respiratory rate. Haas, Distenfeld and Axen (1986) investigated the influences of perceived musical rhythm on respiratory pattern of 15 healthy persons. They found that respiratory rate increased while tidal volume decreased with all types of music, and concluded that respiratory rhythm follows that of music. In a more recent study, no significant correlation was found between the respiratory rate and the classical music played; however, data analysis did not reveal any increase in the rate (Davis-Rollans & Cunningham, 1987).

Circulatory system: Data of several studies conducted to determine the influence of music on heart rate and blood pressure seems consistent. Heart rate and blood pressure of 36 college students increased with vivid and exciting music (Hyde & Scalapino, 1918; Ellis & Brighouse, 1952), while soft, slow tunes decelerated heart rate, decreased systolic and diastolic blood pressure and mean arterial pressure in healthy and in 10 patients undergoing plastic surgery (Podolsky, 1945; Updike & Charles, 1987). More detailed analysis of data collected on 20 college students showed that heart rate increased when the rhythm of music was inconsistent and dynamic (Landreth & Landreth, 1974). Davis-Rollans and Cunningham (1987) found no apparent increase in the occurrence of arrhythmias in 24 cardiac patients listening to relaxing music.

Muscular system: Early observations demonstrated that sedative music decreased muscular expenditure, delayed fatigue and increased muscular endurance (Soibelman, 1948). Scartelli (1982) explored the effect of sedative music on relaxation training of three spastic adults with cerebral palsy. Although the music was played as background, a significant decrease in spasticity was demonstrated. These results are consistent with previous observations. On the other hand, rhythmic musical selections stimulate muscular action and have been successful in improving motor control and walking in 25 patients with gait disorders (Staum,1983).

Effects of Music

The effects of music on the body have been related to three propositions. First, the body's innate rhythms are influenced by rhythmic patterns in music. The tempo appears the major cause of the physiological response to music; tempo of 70-80 beats per minute is soothing, while a faster one raised tension (Cook, 1981; Ingber, Brody & Pearson, 1982). The second proposition states that when two stimuli are received simultaneously by the thalamus, one stimulus reduces the intensity of the other. By listening to music, the individual centers his/her attention on one stimulus (Gardner, Licklider & Weisz, 1960). Finally, music distracts the attention of the subject away from the present situation (Soibelman, 1948), creating either mental imagery or a sense of pleasure.

Summary

In this chapter, the literature related to dyspnea and its correlates and therapeutic effects of music was reviewed. The review indicated that dyspnea is caused by several pathophysiological mechanisms in chronic obstructive airway diseases, but that the perception of dyspnea is individualized. Personal characteristics and psychological tension are important factors influencing the perception of dyspnea. The severity of shortness of breath may be reduced by interventions aimed at relaxing the subjects and consequently decreasing their respiratory and pulse rates. In addition, review of the literature indicated that sedative music relieves apprehension, decreases heart rate and oxygen consumption, and relaxes tensed muscles. No data regarding the effects of music on respiratory rate and dyspnea perception in COAD clients were found.

CHAPTER THREE

METHODOLOGY

Introduction

In this chapter, the research design, sampling method, setting, instrumentation, data collection protocol and plan for data analysis are presented.

Methodology

The purpose of this study was to determine the effects of sedative music on the perception of the severity of dyspnea as reported by COAD clients. Physiological correlates of dyspnea, including the respiratory rate, arterial blood oxygen saturation and heart rate were measured.

Design

A quasi-experimental design directed the planning and implementation of the current study. A removed-treatment design, with pre-test and post-test measurement was used in which subjects acted as their own control. Each subject was randomly exposed to the treatment (i.e., listening to sedative music) and to a control situation. Intensity of dyspnea, respiratory rate, pulse rate and arterial oxygen saturation were measured at six time periods: at baseline, and before and after each of the treatment and control phases (see Figure 2).

Protection of Human Subjects

All subjects were invited to voluntarily participate in the study. The institutional review board of the University of Arizona granted the project permission to conduct the study (Appendix A). Subjects were requested to read and sign an official consent form (Appendix B). No potential risks to the subjects were identified.

Participant anonymity was maintained through the use of assigned code numbers on all data forms.

Sample

The target population was defined as clients with chronic obstructive airway disease, including clients with emphysema, chronic bronchitis and asthma (McVan, 1989; Traver, 1988; Lareau & Larson, 1987). These medical conditions are commonly characterized by limitation to airflow due to narrowing of the conducting passages, resulting in increased resistance with consequent increased work of breathing (Wanner & Sackner, 1983).

Criteria for Selection

Subjects were selected among clients attending the pulmonary clinic affiliated with a university medical center in a large southwestern city. Criteria for inclusion in the

1- Control Phase:

	6 minutes walk		rest	
baseline measures	______	pre-test measures	______	post-test measures

2- Treatment Phase:

	6 minutes walk		music	
baseline measures	______	pre-test measures	______	post-test measures

Figure 2: Study protocol.

sample included: (1) a confirmed medical diagnosis of COAD (asthma, emphysema, chronic bronchitis), (2) a forced expiratory volume in one second (FEV1) 60% or less of predicted as recorded during the last three clinic visits, (3) 45 years of age or older, (4) ability to speak and read English. Exclusion criteria were: (1) inability to ambulate due to musculoskeletal disorders, (2) lung cancer in addition to COAD, (3) medical diagnosis of coronary artery disease that required pharmacologic therapy, (5) need for oxygen therapy with exercise and at rest.

Sampling Procedure

The medical records of clients attending the pulmonary clinic were reviewed to determine the client's medical diagnosis and the most recent recorded FEV1 values. A list of the names of clients who met the criteria for selection was generated from the records reviewed. Each client was individually approached during a regularly scheduled visit to the clinic. During the initial contact, information regarding the investigation was provided; the procedure and potential risk were described; and a written consent form was distributed (Appendix B). The client was allowed ample time to read the consent form and to ask questions. Privacy, anonymity, confidentiality and voluntary participation were verbally emphasized. After obtaining the subject's written consent to participate in the study, a mutually convenient time was scheduled for data collection. Subjects were provided with written directions to the laboratory where the data collection took place. If the subject expressed concern about locating the laboratory, the subject was requested to meet the investigator in a convenient location and was escorted to the laboratory. Recruitment of COAD clients attending the pulmonary clinic continued until a convenience sample of 10 subjects was obtained.

Setting

Data were collected in the Behavioral Laboratory at the College of Nursing, where necessary equipment was readily available and could be used at the subject's convenience. The laboratory setting permitted control over extraneous environmental factors and external stimuli. Environmental stimuli or noises have been shown to influence the effect of music on the listener, by distracting the listener's attention (Zimmerman, et. al., 1988; Zimmerman, et. al., 1989).

Instruments

The perception of dyspnea was measured by the Borg scale; a pulse oximeter was used to measure the subject's oxygen saturation and pulse rate. The respiratory rate was assessed by the investigator (Appendix C). Demographic data were collected using a data collection sheet (Appendix D).

Perception of dyspnea intensity was determined by the subject's rating of the feeling of breathlessness on a Borg scale (Appendix E). The Borg scale is an interval scale ranging from 0 to 10, in which scale numbers are assigned to simple verbal expressions such as "very very slight" to "severe". The Borg rating scale has been used to quantify shortness of breath experienced during a steady state (Mahler,1987) and to assess dyspnea perception resulting from a specific stimulus such as exercise (Brown,1985). Furthermore, the Borg rating scale has been shown to be sensitive to acute changes in the sensation of dyspnea; consequently, it provides "a rapid measure of the efficacy of various therapeutic procedures" (Carrieri & Janson-Bjerklie, 1986, p. 203). In a discussion of the characteristics of the Borg scale, Killian (1985) concluded that it is reproducible, stable and valid as evidenced by the fact that subjects reported higher scores proportional to the increases in the intensity of breathlessness experienced during respiratory loading combined with exercise. Similarly, a modified form of the Borg rating scale was used to determine the relationship between the symptom of breathlessness experienced by asthmatic patients and the degree of air flow obstruction as measured by FEV1. The results indicated an inverse relationship ($r = -.88$) in which breathlessness, as reported on the Borg scale, increased as the FEV1 decreased (Burdon, Juniper, Killian, Hargreave & Campbell, 1982). No reliability studies were reported in the literature.

Physiologic correlates of dyspnea were determined by measurement of the respiratory rate, pulse rate and oxygen saturation. A data collection sheet was used to record data related to the respiratory rate, oxygen saturation and pulse rate (Appendix F). The investigator measured the respiratory rate by counting the number of respiratory cycles for a complete minute. The subject was not informed that respirations were being counted to avoid voluntary modification of respiratory rate. Appendix G summarizes the steps followed during this procedure. Respiratory rate was assessed twice for each measurement period and averaged to reduce potential error. The averaged respiratory rate was used for statistical analysis.

The pulse rate and oxygen saturation were measured by the pulse oximeter (type: Ohmeda, model number 3760). The probe was clipped to the subject's index finger. If the subject was obese, a smaller finger was selected (for a detailed description of the procedure for applying a pulse oximeter, see Appendix G). The pulse rate was recorded every six seconds for one minute during each measurement period. Obtained values were recorded on the data collection sheet. The recorded pulse rates were averaged to obtain a mean pulse rate for each time period. Again, the averaged value was used for statistical analysis.

Because the use of pulse oximetry to determine oxygen saturation has been controversial, several studies have been conducted to determine the accuracy of the available instruments. Oxygen saturation (SaO_2) values obtained by oximetry were compared to SaO_2 values obtained by arterial blood analysis in clients with different alterations. Findings demonstrated that the oximeter was highly accurate for SaO_2 values above 75% but that it overestimated low SaO_2 (Tobin, 1988). Similarly, Hess, Kochansky, Hassett, Frick and Roxrode (1986) found a high correlation ($r = 0.96$) between SaO_2 values greater than 77% as measured by two types of oximeter. They reported that values recorded by oximeter were within 4% of the values measured on arterial blood. Although the pulse oximeter may not be reliable when SaO_2 is less than 60%, it is valuable in monitoring trends in oxygen saturation and providing immediate and continuous feedback. In addition, the pulse oximeter is an accurate convenient non-invasive technique well tolerated by the clients (Schroeder, 1988). In this study, SaO_2 was recorded for every six seconds for one minute during each of the three measurement periods. The mean oxygen saturation for each time period was recorded on the data collection sheet and used in the statistical analysis.

A second data collection sheet (Appendix D) was used to record information about age, sex, ethnic background, health status, and the time of last inhalation of bronchodilator medication. The subject completed the demographic data questionnaire form at the beginning of the data collection session.

Because the use of inhaler and/or breathing exercises (pursed lips or diaphragmatic breathing) may have affected the study results, the subjects were asked whether they used either method during the time of data collection. Their response were recorded on the data collection sheet (Appendix C).

Treatment

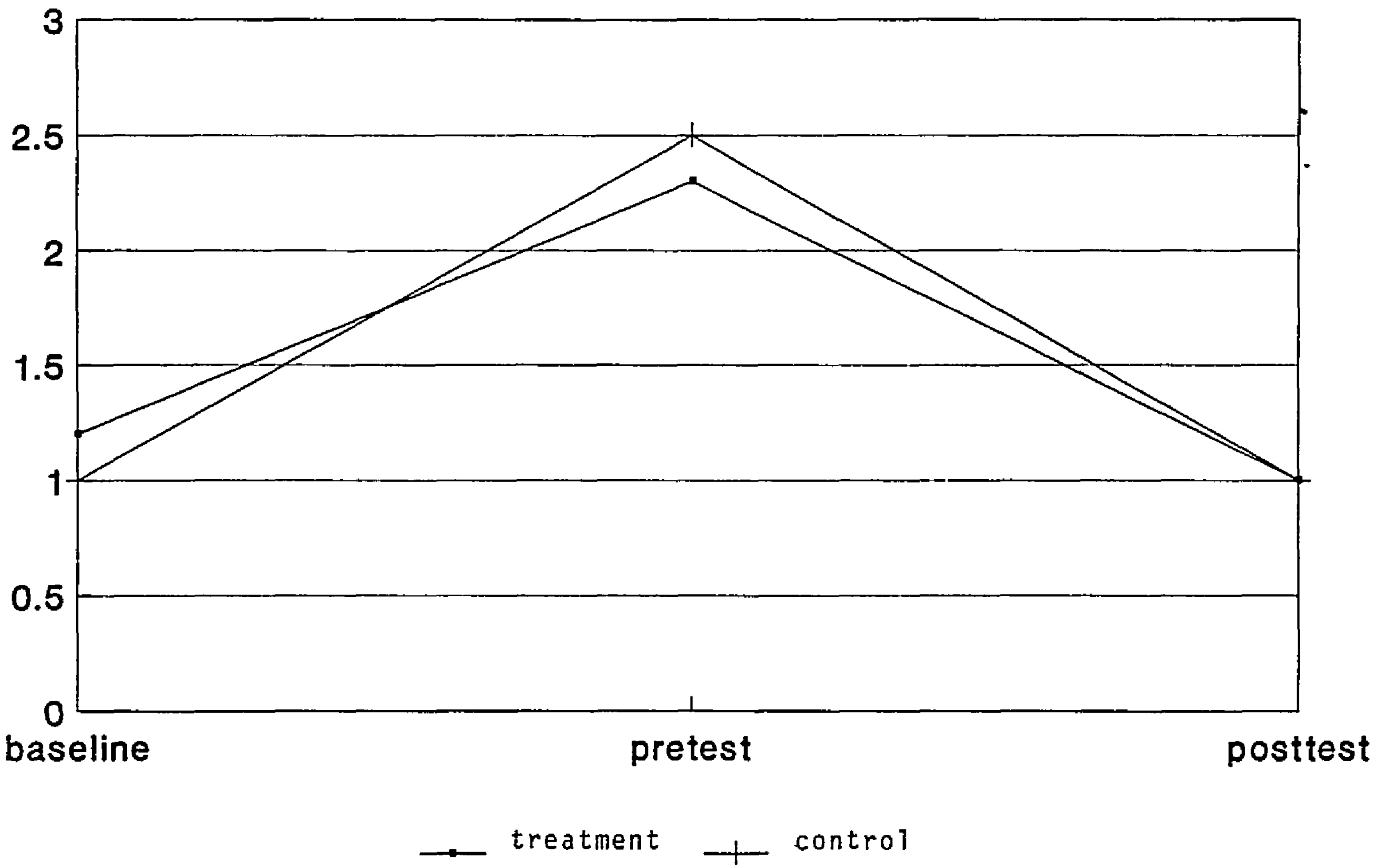
Soft relaxing music, the independent variable, was chosen according to the following criteria:
(1) instrumental, i.e., non vocal, and (2) slow rhythm. A graduate from the School of Music was consulted for proper selection of the musical piece. The music was played for 20 minutes as recommended by the literature (Rohner & Miller, 1980). A cassette player and earphones (type: RCA premier series, Model RP 1816) were provided to the subject.

Data Collection Protocol

Because the subjects had to walk to reach the laboratory setting, they were allowed to rest for 10-15 minutes or until they stated that breathing was normal for them. The subjects were oriented to the setting in order to familiarize them with the equipment and to reduce anxiety. The subjects were asked to complete the demographic data questionnaire form and the dyspnea rating scale. To avoid any bias, the sequence of the application of treatment phase or control phase was randomized (by tossing a coin). All obtained values were recorded as soon as possible. Figure 3 illustrates the data collection protocol.

Baseline respiratory rate, pulse rate and oxygen saturation were measured and recorded. The subjects then were requested to walk for six minute, at their own pace. The six-minute walk test is generally used to evaluate the degree of breathlessness associated with exercise and to evaluate changes in the level of dyspnea over time. (Carrieri & Janson-Bjerklie, 1986). For the purpose of this study, the six-minute walk test was considered a physiological stressor that predisposed to the sensation of dyspnea. Exercise increases oxygen uptake; a proportionate increase in alveolar ventilation accompanies exercise in order to regulate and maintain arterial oxygen tension (PaO_2), arterial carbon dioxide tension ($PaCO_2$) and arterial pH within acceptable levels. In clients with COAD, increased minute ventilation caused by exercise may lead to increased demands of the subjects' limited ventilatory capacity resulting in perception of dyspnea. The sensation

Figure 3 : Distribution of Dyspnea Rating Means during Treatment and Control Phases



of breathlessness arises also from the stimulation of muscle and joint receptors during exercise (Carrieri & Janson-Bjerklie, 1986).

After the six-minute walk, the dependent variables (respiratory rate, pulse rate and oxygen saturation and dyspnea scale) were measured for the second time. These were considered pre-test measurements. Subjects were then asked to rest comfortably in a chair and assume the position in which they felt most restful (e.g., tripod, legs elevated or head reclined). Subjects rested for 20 minutes (i.e., control). During the 20 minute rest period, respiratory rate was assessed on the first and third minutes, and then every five minutes thereafter. Pulse rate and oxygen saturation were monitored continuously during the 20 minute rest period. Post measures of the dependent variables were then taken. Subjects had a 10 minute break, after which baseline data were collected a second time. The subjects took a six minute walk after which measurements of SaO_2, pulse rate and respiratory rate and dyspnea were taken as pre-test measures. The subjects were again asked to rest, but during the rest period the subject listened to music for 20 minutes (i.e., treatment). Earphones were used to avoid any distraction. Pulse rate and SaO_2 were monitored continuously while subjects listened to music; respiratory rate was assessed in the first and third minutes, then every five minutes. Finally, post measures of the dependent variables were taken after the 20 minutes period.

At the end of the data collection session. The answers were recorded on the data collection sheet (Appendix D). Subjects were questioned about the use of bronchodilator and/or breathing exercises during the treatment and control phases.

Statistical Analysis

A series of paired t-test were performed to statistically analyze the data. Paired t-test is recommended when subjects are related, that is, data are obtained from the same subjects under different conditions, data are at the interval level of measurement, and when the results are compared on two dependent groups (Burns & Grove, 1987, p. 525-526). Pre-test measures were compared to post-test measures in each of the treatment and control phases. Comparisons between the control and the treatment measures were also done. Pearson's correlation coefficients were computed to examine relationship between the intensity of dyspnea as perceived by the subjects and the physiological correlates of dyspnea. The Statistical Package for Social Sciences was used to perform these statistical analyses.

The conventional level of significance (alpha = .05) was set for hypothesis testing. Although performing several paired t-tests to analyze the data increases the chance of making type I error, measures to protect alpha level were not of concern in this study. The number of statistical tests was not large enough to require lowering the alpha level. The study hypotheses explored new relationships between variables, thus they are classified under the "context of discovery" (Popper, 1959). In such a context, findings significant at the .05 level are accepted in order to gain new information; however, conclusions are drawn with caution until the study is replicated with a larger sample for confirmation of the findings (Figueredo, 1991, personal communications).

Although an analysis of covariance may be the more appropriate statistical test to examine the effect of the use of an inhaler by the subjects, computation of statistics require that the covariate be a continuous variable and that the effect be studied on at least two independent samples. In this study, the sample were not considered independent. Therefore, multiple regression analysis was used to examine the extent to which the use of an inhaler affected respiratory rate, pulse rate, SaO2 and the perception of dyspnea. Descriptive statistics were used to obtain general tendencies in the sample.

Summary

A quasi-experimental design was used in this study. Subjects with COAD were requested to take two six minute walks. Each walk was followed by a 20 minute rest period. During one 20 minutes rest period, the subject listened to soothing music; during the other 20 minute rest period, the subjects rested without listening to music. The dependent variables (the perception of the intensity of dyspnea, respiratory rate, pulse rate and oxygen saturation) were measured before, during and after each 20 minutes rest period. Pulse rate and oxygen saturation were recorded continuously during the two 20 minute rest periods to avoid disturbing the client. Data were analyzed using paired t-tests.

CHAPTER FOUR

FINDINGS

Introduction

In this chapter, the results of the data analysis are presented. The purpose of the quasi experimental study was to investigate the effect of music on dyspnea perception, respiratory rate, pulse rate and oxygen saturation of subjects with COAD. Findings are presented in relation to characteristics of the sample, perception of dyspnea, pulse rate, respiratory rate and oxygen saturation across three measurment periods; relationship between dyspnea rating and physiological measures; and finally in relation to each of the seven hypotheses

Findings

Characteristics of the Study Sample

The characteristics of the sample are presented in Table 1. A convenience sample consisted of ten subjects, eight females and two males, with a mean age of 68.5 years (range: 58-77 years, SD: 5.8 years). Nine subjects were white; one was black. Four subjects were diagnosed with asthma (40%), three with asthmatic bronchitis (30%), two with emphysema (20%) and one with bronchitis (10%). The duration of the disease, as reported by the subjects, ranged

Table 1 : Characteristics of the Sample.

Characteristics	Frequency	Percentage
Gender:		
female	8	80
male	2	20
Ethnic Background:		
white	9	90
black	1	10
Medical diagnosis:		
asthma	4	40
asthmatic bronchitis	3	30
emphysema	2	20
bronchitis	1	10
Presence of other medical conditions	5	50

between 4 and 31 years with a mean of 15.7, and a SD of 11.4. Fifty percent of the sample reported the presence of concurrent disease including diabetes mellitus, hypertension, seizure disorders and arthritis.

The subjects reported several methods for relieving dyspnea including the use of bronchodilator, medication, rest, relaxation and breathing exercise (Table 2). The use of bronchodilator, either alone or in combination with another method, was the most frequently reported method by the subjects to reduce dyspnea. Nine subjects regularly used an inhaler. Five subjects said that they sometimes perform breathing exercises through pursed lips; two reported performing using pursed lips breathing all the time and three did not perform pursed lip breathing at all. The forced expiratory volume in one second (FEV1) values (reported in percentage in the medical charts) recorded during the last three clinic visits, ranged between 23% and 56% of predicted, with a mean of 39.5% (SD =10.9%). The last time before data collection an inhaler was used varied among the subjects. Two subjects did not use an inhaler before or during data collection time; however, eight subjects used an inhaler one to three hours prior to data collection (mean = 1.5 hours, SD = 1.1).

Table 2: Method for Relieving Dyspnea as Reported by the Subjects.

Method	Frequency	Percentage
Nothing	1	10
Bronchodilator	2	20
Breathing exercise	1	10
Bronchodilator & medication	2	20
Bronchodilator & rest	1	10
Relaxation & breathing exercise	1	10
Bronchodilator & breathing exercise & rest	2	20
TOTAL	10	100

Perception of Dyspnea

The perception of dyspnea intensity was determined by the subjects' rating their sensation of breathlessness on a Borg scale. The scale ranged from 0-"nothing at all" to 10-"very very strong". The ratings are presented in Table 3. The mean rating of dyspnea in the control phase changed with the time of measurement; the mean rating at baseline was 1.0 (SD: 1.1), at pre-testing, i.e., after the six minute walk, 2.5 (SD: 1.7) and at post-testing 1.0 (SD: 1.4). Findings indicated a sharp increase in perception of dyspnea at pre-testing period occurring after the six minute walk. Analysis of paired t-test results showed a statistically significant difference between the mean perceived dyspnea rating at pre-test, and post-test during the control phase (difference mean = 1.50, $t = 2.50$, $p = .03$, $df = 9$). However, the post-test rating mean returned to baseline value (post-test mean = 1.0, baseline mean = 1.0).

The mean rating of dyspnea in the treatment phase showed similar trend as that observed in the control phase with a mean rating of 1.2 at baseline, 2.3 at pre-testing and 1.0 at post-testing. A slight increase in the perceived intensity of dyspnea was reported at pre-test period (Table 3). A statistically significant difference was obtained when comparing the mean rating at pre-test and post-test

Table 3: Mean Rating of Dyspnea by Phase for each Measurement Period

Phase	Time	Range	Mean	SD
Control	baseline	0-3	1.0	1.1
	pre-test	0-5	2.5	1.7
	post-test	0-4	1.0	1.4
Treatment	baseline	0-5	1.2	1.6
	pre-test	1-4	2.3	1.3
	post-test	0-5	1.0	1.6

0: "Nothing at all"

10: "Very very severe"

in the treatment phase (difference mean = 1.35, t = 2.38, p = .04, df = 9).

The subjects' mean dyspnea ratings during treatment and control phases were compared using paired t-test. Analysis showed no statistically significant difference in the sensation of breathlessness reported at baseline, pre-test and post-test in the control and treatment phases (Table 4). It is worth noting that there is a great variability in the rating of dyspnea by the subjects, as evidenced by standard deviations larger than the means.

Respiratory Rate

The respiratory rate was measured by the investigator. Each respiratory cycle was counted as one breath. The respiratory rate was monitored for one full minute and was assessed twice for each measurement period. The two rates were then averaged for a mean respiratory rate for each subject. The respiratory rate followed similar patterns in the treatment and control phases.

In the control phase, the subjects' mean respiratory rate was was 17.5 breaths/minute at baseline, increased to 19.3 breaths/minute at pre-test and decreased to 18.6 breaths/minute at post-test (Table 5). The difference between the pre-test and post-test mean respiratory rate was not statistically significant (difference mean = .75, t = .70, df = 9, p = .50). The respiratory rate was

Table 4: Comparison of Mean Dyspnea Perception During the Three Measurment Periods in the Treatment and Control Phases.

Time	Difference Mean	t-value	df	p
Baseline	.2	.23	9	.82
Pre-test	-.2	-.52	9	.61
Post-test	-.05	-.32	9	.75

Table 5: Mean Respiratory Rate by Phase for each Measurement Period.

Phase	Time	Range	Mean	SD
Control	baseline	11-23	17.50	4.26
	pre-test	13-25	19.35	4.32
	post-test	14-25	18.60	3.49
Treatment	baseline	11-23	17.15	4.69
	pre-test	14-26	19.25	4.52
	post-test	13-24	17.20	3.49

recorded at the first and third minutes and every five minutes thereafter during the 20 minute rest period. Figure 4 shows a slight increase at the third minute followed by a constant decrease throughout the remaining 17 minutes of the period.

In the treatment phase, the mean respiratory rate was 17.15 breaths/minute at baseline, increased to 19.25 breaths/minute at pre-test and decreased to 17.20 at post-test. A paired t-test value of 2.51 indicated a significant difference in respiratory rate before and after listening to music (difference mean = 2.05, df = 9, p = .03). The respiratory rate tended to decrease steadily during the 20 minutes listening to music (Figure 4). A decrease in the respiratory rate occurred within three minutes in the treatment phase, while the respiratory rate continued to increase and dropped later in the control phase.

A series of paired t-tests was done to determine the presence of any significant difference in the respiratory rate in the treatment and control phases (Table 6). Results indicated that the mean respiratory rate at the treatment post-test is significantly lower than the respiratory rate at the control post-test (t = 2.78, p = .02).

Figure 4 : Distribution of Respiratory Rate Means during Treatment and Control Phases

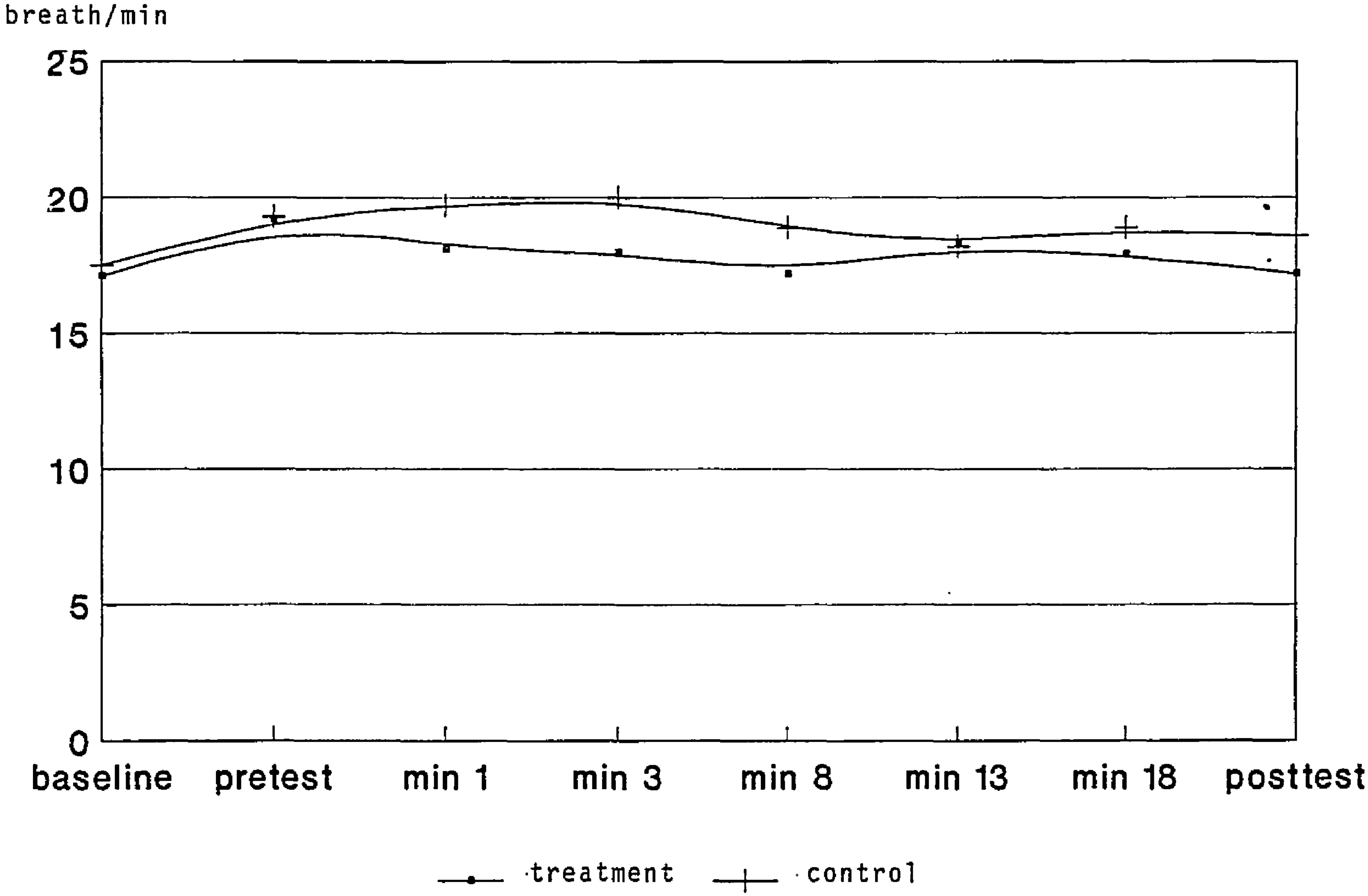


Table 6: Comparison of Mean Respiratory Rate During the Three Measurement Periods in the Treatment and Control Phases.

Time	Difference Mean	t-value	df	p
baseline	- .35	- .17	9	.86
pre-test	- .10	- .15	9	.88
post-test	- 1.4	- 2.78	9	.02

Pulse Rate

The averaged pulse rate was reported for each measurement time; baseline, pre-test, and every minute for each of the 20 minute rest periods, and post-test. The mean pulse rate for all the subjects varied across time and between the treatment and control phases (Table 7).

In the control phase, mean pulse rate increased from 80.4 beats minute at baseline to 83.1 beats/minute at pre-test, and then decreased to 76.5 (below baseline) at post-test. A paired t-test was computed to compare mean pulse rate at pre-test and post-test time period. Results indicated a significant difference between the mean pulse rate before and after resting for 20 minutes (difference mean = 6.5, t = 3.6, df = 9, p = .005). Analysis of the minute by minute mean pulse rate indicated that the mean pulse rate decreased rapidly from 83.1 beats/minute at pre-test to 79.0 beats/minute at minute 1 (Figure 4); the mean pulse rate increased slightly at minutes 2 and 3 then dropped slowly but steadily during the last 17 minutes of the rest period until the pulse rate reached 77.6 beats/minute. However, mean pulse rate recorded at minute 20 is still slightly higher than the pulse rate measured at post-test.

Table 7: Mean Pulse Rate by Phase for each Measurement Period.

Phase	Time	Range	Mean	SD
Control	baseline	60-96	80.47	11.61
	pre-test	66-105	83.11	11.01
	post-test	57-90	76.58	9.96
Treatment	baseline	58-89	75.14	10.24
	pre-test	60-97	79.10	11.21
	post-test	58-83	72.00	9.58

Similar results were seen in the treatment phase. The mean pulse rate increased from 75.1 beats/minute at baseline to 79.1 beats/minute at pre-test, then dropped to 72 beats/minute (below baseline level) at post-test (Table 7). A statistically significant difference was obtained when comparing the mean pulse rate at pre-test to the post-test in the treatment phase (difference mean = 7.1, t = 5.8, df = 9, p = .00). The mean pulse rates decreased steadily throughout the 20 minutes period during which the subjects were listening to music (Figure 5).

Paired t-tests were used to compare the mean pulse rates between the treatment and control phases (Table 8). Results indicated that pulse rate at baseline and pre-test were not significantly different between the two phases. The mean post-test pulse rate in the treatment phase was significantly lower than the pulse rate in the control phase with a t-value of -2.9 at p = .01.

Percent of Oxygen Saturation (SaO2)

The percent of oxygen saturation was measured with a pulse oximeter for one full minute during each measurement period; the oximeter recorded the percent oxygen saturation every six seconds. These ten SaO2 values were averaged which allowed to report one averaged value for each measurement period. The mean SaO2 values are presented

Figure 5 : Distribution of Pulse Rate Means during Treatment
and Control Phases

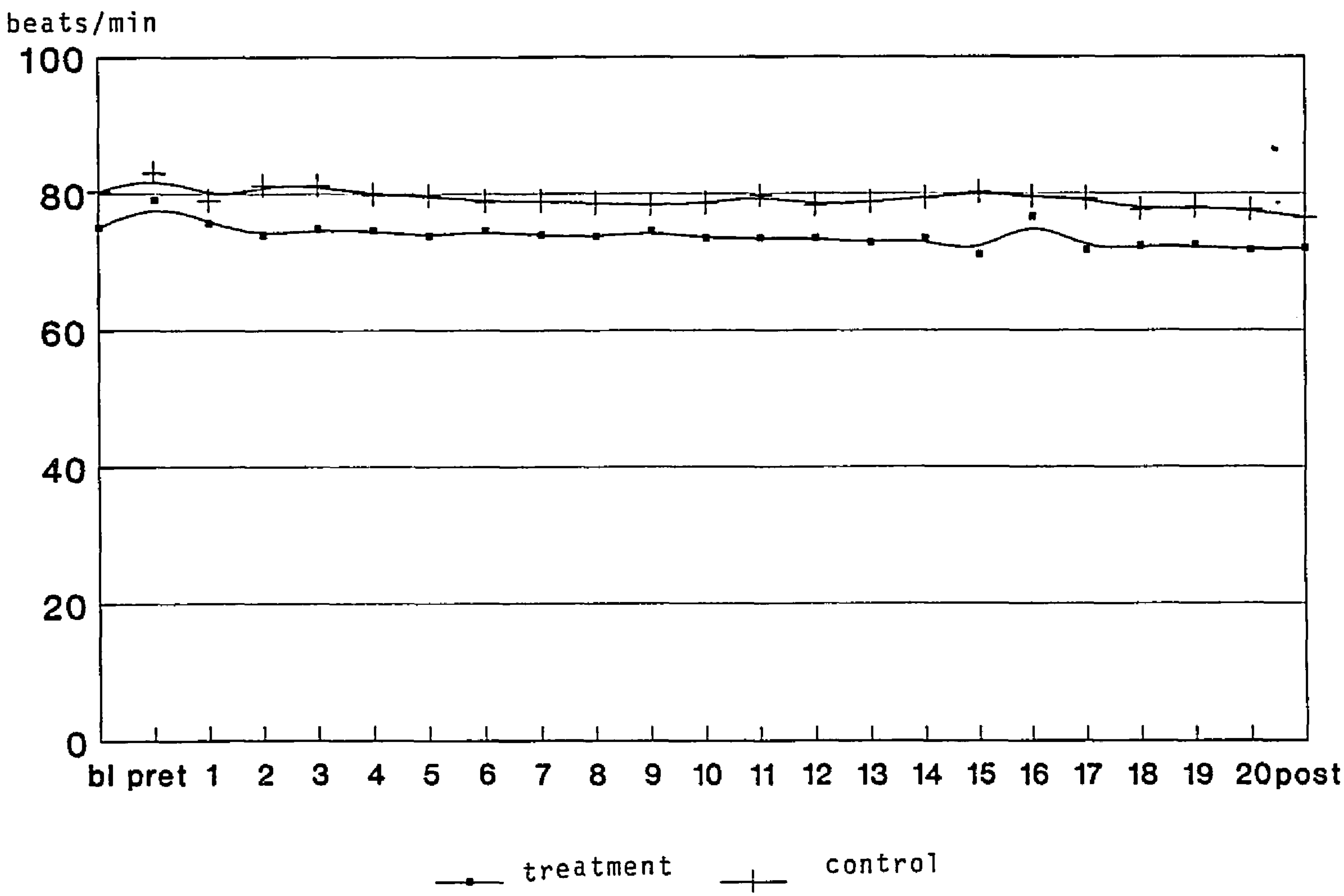


Table 8: Comparison of Mean Pulse Rate During the Three Measurement Periods in the Treatment and Control Phases.

Time	Difference Mean	t-value	df	p
Baseline	5.33	-1.09	9	.29
Pre-test	-4.01	-2.03	9	.07
Post-test	-4.58	-2.92	9	.01

in Table 9. The subjects' average SaO_2 was slightly higher during the treatment phase then the control phase.

During the control phase, the percent SaO_2 at post-test measurement returned to near baseline level, while it increased at pre-test measurement. The difference between the pre-test and post-test means was not statistically different (difference mean = .44, $t = .74$, $df = 9$, $p = .48$). In Figure 6, the pattern of the percent SaO_2 during the 20 minute control and treatment periods is illustrated. Findings indicated a slight decrease in SaO_2 throughout.

During the treatment phase, the percent SaO_2 was lowest at baseline (mean = 92.4%), increased slightly at pre-test to 94.0% and decreased to 93.1% at post-test. The difference between the pre-test and the post-test values was not statistically significant (difference mean = .9, $t = 2.1$ $df = 9$, $p = .06$).

While listening to music for 20 minutes, the percent SaO_2 decreased steadily from baseline to post-test (Figure 6). Table 10 presents a summary of the results of a series of paired t-test conducted to assess any difference between the percent SaO_2 in the treatment and control phases. None of the t-test results was statistically significant. None of the percent SaO_2 levels dropped below the 90-97% level.

Table 9: Mean Percent Oxygen Saturation by Phase for each Measurement Period.

Phase	Time	Range	Mean	SD
Control	baseline	91-94	92.76	.86
	pre-test	91-96	93.26	1.26
	post-test	91-95	92.82	1.27
Treatment	baseline	91-95	92.49	1.22
	pre-test	92-97	94.05	1.41
	post-test	91-94	93.14	1.13

Figure 6 : Distribution of SaO2 Means during Treatment and Control Phases

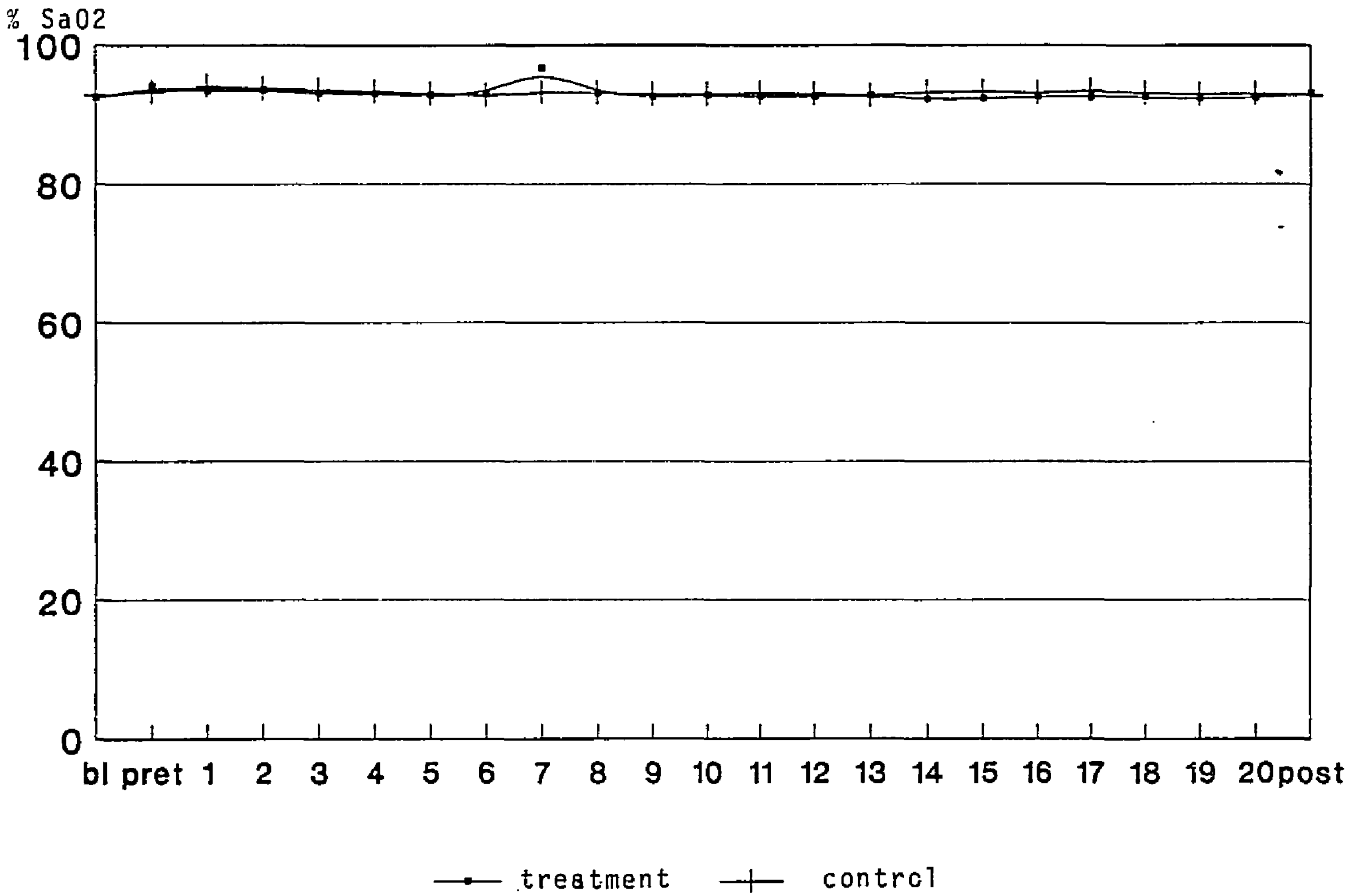


Table 10: Comparison of the Mean Percent Oxygen Saturation during the Three Measurement Periods in the Treatment and Control Phases.

Time	Difference Mean	t-value	df	p
Baseline	-.47	-.57	9	.57
Pre-test	.71	2.03	9	.07
Post-test	.32	.77	9	.46

Relationship Between Dyspnea Rating and Physiologic Measures

Pearson correlation coefficients were computed to determine the size and direction of the relationship between the mean perception of dyspnea ratings on the Borg scale and these physiologic measures: respiratory rate, pulse rate and percent oxygen saturation. The correlation matrix is presented in Table 11. The mean values of these variables were correlated at baseline, pre-test and post-test. Analysis of Table 11 demonstrates a weak-to-moderate correlation (Pearson's product moment coefficient r ranging from .3 to .5) between (1) dyspnea rating measured at baseline and percent oxygen saturation measured at pre-test, and (2) dyspnea rating measured at post-test and percent oxygen saturation measured at baseline, pre-test and post-test. These correlation coefficients were significant at an alpha level less or equal to .05. The correlation between perceived dyspnea intensity and pulse and/or respiratory rates were not statistically significant.

The Effect of Use of Inhaler

During data collection, subjects were allowed to use the inhaler that they regularly use if they felt the need to do so. The use of an inhaler (a bronchodilator) alters the physiologic mechanisms involved in respiration and consequently makes respiration easier. Therefore, the

Table 11: Correlation Matrix Between Intensity of Dyspnea Perception and its Physiologic Correlates.

	Pulse Rate			Respiratory Rate			Percent SAO2		
Dyspnea	BL	Pre-T	Post-T	BL	Pre-T	Post-T	BL	Pre-T	Post-T
BL	.34*	.19	.30	.13	.09	.18	.32	.50*	.37*
Pre-T	.31	.34*	.47	-.28	-.02	-.26	.24	.24	-.02
Post-T	.25	.04	.23	.13	-.01	.22	.38*	.44*	.51*

* p < .05

BL : Baseline

Pre-T : Pre-Test

Post-T : Post-Test

subjective sensation of dyspnea may have been influenced by inhaler use. The use of an inhaler was considered an uncontrolled variable that may have affected the results. Multiple regression analysis was performed to determine the extent of the inhaler's effects on the dependent variables. Table 12 summarizes the results of the multiple regression. Use of inhaler/bronchodilator accounted for 28 to 35% of the variance (p = .02 to .05) in the perceived intensity of dyspnea reported by the subjects. In addition, use of inhaler explained 31% of the variance in the pre-test respiratory rate and 51% of the individual variance in percent oxygen saturation measured after resting and listening to music.

Hypotheses

The findings are reported in relation to each of the hypotheses that guided the study.

Hypothesis 1: "The COAD clients' perception of dyspnea will be significantly less after resting while listening to sedative music for 20 minutes than the same subjects' perception of dyspnea after resting for 20 minutes without sedative music."

The mean dyspnea intensity (mean = 1.0) reported by the subjects after listening to music did not differ significantly from the mean dyspnea intensity (mean = 1.0)

Table 12: Multiple Regression Analysis: Dependent Variables by Use of Inhaler/Bronchodilator.

Dependent Variable	Time	R-squared	df	F value	p
DYSPNEA	baseline	0.28	2	3.39	.05
	pre-test	0.25	2	2.84	.08
	post-test	0.35	2	4.36	.02
RESPIRATORY RATE	baseline	0.08	2	.74	.49
	pre-test	0.31	2	3.86	.04
	post-test	0.16	2	1.63	.22
PULSE RATE	baseline	0.07	2	.71	.50
	pre-test	0.06	2	.57	.57
	post-test	0.88	2	.83	.45
PERCENT SaO2	baseline	0.15	2	1.55	.23
	pre-test	0.02	2	.24	.79
	post-test	0.51	2	8.87	.00

reported after resting only ($t = -.32$, $p = .75$). Thus, the first hypothesis was not supported.

Hypothesis 2: "The COAD subjects' pulse rate will be significantly less after resting while listening to sedative music for 20 minutes than the same subjects' pulse rate after resting for 20 minutes without sedative music".

The mean pulse rate (mean =72.0) measured after listening to music was significantly lower than the mean pulse rate (mean = 76.58) measured after resting only. A t-value of -2.92 was significant at $p = .01$. Thus the second hypothesis was supported.

Hypothesis 3: "The COAD subjects' respiratory rate will be significantly less after resting while listening to sedative music for 20 minutes than the same subjects' respiratory rate after resting for 20 minutes without sedative music."

The mean respiratory rate (mean = 17.20) measured after listening to music was significantly lower than the mean respiratory rate (18.60) measured after resting only. A t-value of -2.78 was significant at $p = .02$. The third hypothesis was supported. In addition, the mean post-test respiratory rate is significantly lower than the mean pre-test respiratory rate in the treatment phase, indicating that music does indeed affects respiratory rate.

Hypothesis 4: "The COAD subjects' arterial oxy-hemoglobin saturation level will be significantly higher after resting while listening to sedative music for 20 minutes than the same subjects'arterial oxy-hemoglobin saturation level after resting for 20 minutes without music."

The mean percent oxygen saturation (mean = 93.14) measured after listening to music was not significantly different from the mean percent SAO2 measured after resting only (mean = 92.82). This finding does not support the fourth hypothesis.

Hypothesis 5: "There will be statistically significant positive correlation between the perceived intensity of dyspnea by subjects with COAD and the subjects' respiratory rate".

This hypothesis was not supported.

Hypothesis 6: "There will be statistically significant positive correlation between the perceived intensity of dyspnea by subjects with COAD and the subjects' and pulse rate".

This hypothesis was not supported.

Hypothesis 7: "There will be statistically significant negative correlation between the perceived intensity of dyspnea by subjects with COAD and the subjects' arterial oxy-hemoglobin saturation level."

A moderate positive correlation was observed between dyspnea ratings at baseline and post-test, and percent SaO2; the direction of the correlation is contrary to predicted.

Summary

The results of this quasi-experimental study with ten subjects with COAD demonstrated that the mean respiratory and pulse rates of subjects with COAD decreased significantly after listening to sedative music. Their perception of breathlessness and their oxygen saturation level were not significantly altered after listening to music. Personal characteristics and use of bronchodilator during data collection may have influenced their report of sensation of breathlessness. Finally, the physiologic parameters of dyspnea (respiratory rate, pulse rate and percent SaO2) did not significantly correlate with the subjective perception of shortness of breath.

CHAPTER FIVE

IMPLICATIONS

Introduction

Discussion of the study findings and the limitations of this study are discussed in this chapter. Future recommendations and implications for nursing practice are also presented.

Discussion

The results of this study are discussed in relation to the hypotheses that guided the investigation. Specifically the effects of listening to music on the perceived intensity of dyspnea, pulse rate, respiratory rate and oxygen saturation level will be discussed.

Several factors may be considered when attempting to explain the finding that sedative music did not alleviate the intensity of dyspnea perception. First, dyspnea is viewed as a sensation evoked by the perception of sensory stimuli. Perception involves the integration of sensory input by the central nervous system and is affected by personal characteristics of the individual, including previous experience and learning (Killian, 1985). As a result, reported dyspnea varies among people; consequently, individual variability in reporting the intensity of dyspnea is a potential confound not accounted for in the analysis.

Second, clients with chronic pulmonary disease have been shown to have greater tolerance for breathlessness than do healthy people; thus clients with COAD perceive dyspnea less intensely than healthy clients with acute pulmonary conditions. Gottfried, et. al. (1981), conducted a study to determine the relationship between physiological changes and subjective perception of airflow resistance as a measure of dyspnea. Their findings showed that patients with COPD reported elevations in the perception of resistance not proportional to the increase in added loads of resistance. Moreover, Janson-Bjerklie, Ruma, Stulberg and Carrieri (1987) studied relationships of selected variables and the intensity of dyspnea perceived by asthmatic subjects. Correlational analysis showed that the magnitude of dyspnea was not related to airway resistance, and was negatively related to age and to frequency of attack. Finally, results of studies conducted by Tiller, Pain and Briddle (1987) indicated that the perception of dyspnea may decline with prolonged exposure to the stimulus (i.e., principle of adaptation to the stimulus). In the present study, advanced age of the subjects (mean age = 68.5 years) and reported chronicity of the pulmonary disease (mean number of years with COAD = 15.7 years) are factors that could have contributed to the perception of low-intensity breathlessness. Furthermore, the use of inhaler/ bronchodilator during data collection could have affected the perceived intensity of dyspnea.

The weak effect of music on dyspnea perception could be an indirect one. Findings of previous investigations confirm that the emotional condition of a person, mainly anxiety, influences the respiratory status as well as the perception of respiratory changes (Dudley, Martin & Holmes, 1968; Heim, Knapp, Vachon, Globus & Nemetz, 1968; Gift, Plaut & Jacox, 1986). Results of other investigations suggest that by alleviating psychological discomfort through relaxation , less dyspnea was reported and the breathing patterns were positively changed (Agle, et. al., 1973; Carrieri, et. al., 1984; Renfroe, 1988). The emotional status of the subjects was not of concern in this study and therefore does not permit examination of the effects of music on the relationship between the psychological condition and the intensity of dyspnea. However, when analyzing each phase separately, and disregarding the emotional condition of the subjects, a relatively sharp increase in perceived intensity of dyspnea was noted after the six minutes walk, a finding similar to those obtained by Cohan, Mulholland, Leitner, Altose and Cherniack (1990); in addition, a statistically significant difference between pre-test and post-test dyspnea ratings was observed before and after listening to music. These findings suggest that exercise-induced dyspnea is relieved equally after rest or after listening to music for 20 minute. A faster recovery was observed with music than without music. These findings imply that the perception of the intensity of dyspnea varied with the personal characteristics of the individual; therefore, methods to relieve dyspnea should be individualized as well. Listening to sedative music can be considered an alternative method to reduce breathlessness in some individuals.

Findings of this study indicated that listening to music decreased pulse rate. This finding is consistent with results of previous investigations where soft slow tunes decelerated heart rate (Podolsky, 1945; Ellis & Brighouse, 1952; Landreth & Landreth, 1974; Bonny, 1983; Updike, 1987; Charles, 1987; Davis-Rollans & Cunningham, 1987). More recently, Summers, Hoffman, Neff and Pierce (1990) found that 60 beats per minute music lowered heart rate of students taking a test. Data analysis demonstrated a steady drop in pulse rate during the 20 minutes listening to music with a significant difference in pulse rate between pre-test and post-test values. Although mean pulse rate during resting showed a similar trend, listening to music after exercise seemed more effective in maintaining a slower pulse rate during and after the 20 minute period. The effect of bronchodilator's use was not significant on pulse rate. These results imply that listening to sedative music is an effective intervention in reducing pulse rate.

The respiratory rate was decreased after listening to music. Previous research findings were not conclusive regarding the effect of music on respiratory rate. The present results are however, consistent with conclusions stating that "external rhythmic auditory cues can act as pacemaker that synchronizes breathing" (Haas, Distenfeld & Axens, 1986, p. 1185). Although the use of bronchodilator did not affect respiratory rate, the chronicity of the disease over a mean time period of 16 years suggests that subjects have developed personal ways of relieving hyperpnea associated with dyspnea. Performing pursed lip breathing is of concern in this study since its application while listening to music could have affected the results. Multiple regression analysis indicated that use of inhaler accounted for 31% of the variance in pre-test respiratory rate, but did not account for the variance in post-test respiratory rate. These findings imply that respiratory rate can be actually reduced by listening to sedative music in conjunction with pharmacologic therapy.

The oxy-hemoglobin saturation level did not increase after listening to music as predicted. No published investigation of this relationship was found. Failure to support the fourth hypothesis can be related to the use of bronchodilator/inhaler which affected the subjects' SaO_2 measured after resting/listening to music. Findings indicate that 51% of the variance in post-test SaO_2 was accounted for by the use of the inhaler. A bronchodilator administered through an inhaler is used to reduce the airway resistance which improves ventilation. As the alveolar oxygen tension is increased, more oxygen diffuses across the alveolar-capillary membrane thus raising the arterial oxygen tension and consequently oxygen saturation level (Marini, 1988). Another plausible explanation is that the subjects were able to hyperventilate during the rest periods.

Failure to have significant correlations between perception of dyspnea and respiratory and pulse rates requires further investigation. However, a moderate positive correlation was observed between dyspnea perception and SaO_2. This finding can not be explained or clarified physiologically since severe dyspnea in COAD is usually accompanied by obstruction and hyperinflation leading to increased airway resistance which increases work of breathing and limits airflow from and/or to the alveoli. consequently the availability of oxygen is decreased and the resulting hypoxemia is reflected in low SAO_2 saturation

(Gottfried, Altose, Kelsen & Cherniack,1981; Taylor & Whitman,1986).

It can be concluded that the subjective rating of dyspnea does not correlate with respiratory rate, pulse rate and oxygen saturation level in these subjects with COAD. Mahler, Rosiello and Harver (1987) investigated the relationship between the subjective and objective parameters of dyspnea (namely pulmonary function tests). They found that the intensity of dyspnea was not significantly correlated with the resistive loads. Personal characteristics such as age, sex, duration of illness, cultural background were believed to have affected the perception of dyspnea and contributing to the incompatibility between the objective and subjective measures.

It can be concluded from this study that sedative music decreased respiratory rate and pulse rate in subjects with COAD who had a FEV1 ranging between 23 and 56% of predicted, and who experienced none-to-moderate dyspnea (rated 0 to 5 on a Borg scale). Moreover rating of perceived dyspnea, pulse and respiratory rates also decreased after resting without listening to music. Therefore, it can not be concluded that a reduction in dyspnea and its physiologic correlates is a direct consequence of music. The 20 minute rest period could have interacted with music to produce the observed responses.

These findings are consistent with the theoretical perspectives underlying the study. The perception of dyspnea is subjective and is influenced by individual characteristics; however, the subjective report of breathlessness does not necessarily reflect the physiological changes related to pulse rate, respiratory rate and SaO2 accompanying dyspnea.

Limitations

The results of this study can not be generalized to the population of clients with COAD for several reasons. First, the sample was one of convenience. Subjects were selected if they were aged 45 years or more and if they did not receive oxygen therapy with exercise and at rest. The effect of sedative music on younger subjects that are diagnosed as having COAD was not determined. Dyspnea related to hypoxemia manifested by low oxygen saturation level may not be relieved by listening to music. Also, the small sample size (n=10) does not allow generalization of the results to the larger population. Furthermore, individual idiosyncrasies could have played a major role in the observed response to music. In general, sex is a factor contributing to the variability in the response to music, with females showing a more favorable response than males (Peretti, 1975). The present sample consisted mainly of females subjects (80%), which is not representative of the sex distribution among COAD clients (Jarvis, 1981).

The present results can not be generalized to situations where COAD clients report severe dyspnea, defined as difficult breathing rated above 5-"strong" on the Borg scale. None of the subjects rated dyspnea more than 5; so the effect of sedative music on severe breathlessness can not be determined based on the current results.

Furthermore, the type of music used in this study may not be soothing to everyone. Preference to certain type of music was found to contribute not only to enjoyment but also to the relaxing effect it has on the listener (Schullian & Schoen, 1948; Healey, 1973).

Fatigue due to a long session for data collection (approximately two hours) could have affected the results. Fatigue may have influenced the perception of the intensity of dyspnea. Finally, the six minutes walk (the stimulus used to produce dyspnea), done at the subject's pace, may not have resulted in severe dyspnea as anticipated, since walking is an activity of daily living carried on by the persons regularly; that is, subjects may not have exercised rigorously to a point leading to dyspnea.

Recommendations

Based on the results and limitations of this study, the following recommendations are proposed:

1- conducting an experimental study with matched treatment and control groups to determine the effects of sedative music on the respiratory status of clients with COAD. An experimental design allows control for extraneous variables that are thought to affect the results. Subjects should be matched on characteristics that influence the response to music such as age, sex, cultural background, and musical background.

2- determine the effects of sedative music on respiratory rate, pulse rate, oxy-hemoglobin saturation level and perception of dyspnea on a large number of subjects with COAD. A larger sample size is more representative of the target population.

3- evaluate the effectiveness of sedative music on relieving dyspnea produced after a twelve minutes walk. A twelve minutes walk is a standard diagnostic tool for dyspnea and demands prolonged effort on the part of the subject therefore is more likely to stimulate breathlessness.

4- evaluate the effects of sedative music on the psychological as well as the physiological status of subjects with COAD. Other dependent variables can be examined such as state anxiety, depth of respiration, rhythm of respiration and muscle relaxation. Inclusion of these variables would allow experimentation of a comprehensive or holistic response to sedative music.

5- determine the effect of sedative music on the perception of acute dyspnea, experienced by subjects with non-chronic respiratory diseases such acute bronchitis, pneumonia, heart failure and lung cancer. Subjects with acute dyspnea may respond more favorably to sedative music.

6- assess the differential effect of subjects' musical preference (such as light jazz, classical) on the respiratory status of healthy and ill persons, taking into consideration the subject's preference. Musical preference is believed to influence the subject's psychological and probably physiological response.

7- compare the psychological and physiological response of COAD clients listening to music to the response of COAD clients performing some kind of relaxation techniques in order to determine the differential therapeutic effectiveness of these interventions in relieving breathlessness.

8- evaluate the response of COAD clients to sedative music on repeated occasions. Training subjects to concentrate on listening to music and implementing this intervention on a regular basis may result in a more favorable response to music.

9- examine the effect of sedative music on subjects with severe dyspnea related to hypoxemia manifested by low oxygen saturation level. Subjects receiving oxygen therapy may experience severe dyspnea due to their hypoxic state.

Implications for Nursing Practice

Listening to sedative music was found to be successful in decreasing respiratory rate and pulse rate in clients with COAD. Encouraging clients with COAD to listen to sedative music seems a promising nursing intervention aimed at relieving dyspnea in some clients. Listening to sedative music is a non-intrusive procedure that can be easily undertaken and tolerated by clients. However, personal characteristics of the clients, specifically age, sex, ethnic background and musical background, should be assessed and taken into consideration before prescribing or encouraging them to listen to sedative music. Listening to sedative music is not recommended for clients who do not like music.

Summary

Although the respiratory and pulse rates decreased after listening to sedative music, the results of this study can not be generalized to the target population due to convenience sampling and small sample size. Further investigations designed to assess the effectiveness of music in modifying the physiological and psychological status of clients with COAD are recommended. Encouraging COAD clients experiencing moderate dyspnea to listen to sedative music is a supplemental nursing intervention that may be effective in decreasing respiratory and pulse rates.

APPENDIX A

HUMAN SUBJECTS COMMITTEE APPROVAL

The University of Arizona
Human Subjects Committee
1690 N Warren (Bldg 526B)
Tucson, Arizona 85724
(602) 626-6721 or 626-7575

23 January 1990

Souraya Sidani
c/o Ann Woodtli, Ph.D., R.N.
College of Nursing
Arizona Health Sciences Center

RE: HSC #90-09 EFFECTS OF SEDATIVE MUSIC ON THE RESPIRATORY STATUS OF CLIENTS WITH CHRONIC OBSTRUCTIVE AIRWAY DISEASE

Dear Ms. Sidani:

We received your above referenced project. The procedures to be followed in this study pose no more than minimal risk to participating subjects. Regulations issued by the U.S. Department of Health and Human Services [45 CFR Part 46.110(b)] authorize approval of this type project through the expedited review procedures, with the condition(s) that subjects' anonymity be maintained. Although full Committee review is not required, a brief summary of the project procedures is submitted to the Committee for their endorsement and/or comment, if any, after administrative approval is granted. This project is approved for one year effective 23 January 1990.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number M-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no changes or additions will be made in study personnel, to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

Milan Novak, M.D., Ph.D.
Chairman
Human Subjects Committee

MN/ms

cc: Departmental/College Review Committee

APPENDIX B

CONSENT FORM

CONSENT FORM

"The relationship between music and the respiratory status of clients with COAD".

YOU ARE BEING ASKED TO READ THE FOLLOWING MATERIAL TO ENSURE THAT YOU ARE INFORMED OF THE NATURE OF THIS RESEARCH STUDY AND OF HOW YOU WILL PARTICIPATE IN IT, IF YOU CONSENT TO DO SO. SIGNING THIS FORM WILL INDICATE THAT YOU HAVE BEEN SO INFORMED AND THAT YOU GIVE YOUR CONSENT. FEDERAL REGULATIONS REQUIRE WRITTEN INFORMED CONSENT PRIOR TO PARTICIPATION IN THIS RESEARCH STUDY SO THAT YOU KNOW THE NATURE AND THE RISKS OF YOUR PARTICIPATION AND CAN DECIDE TO PARTICIPATE OR NOT PARTICIPATE IN A FREE AND INFORMED MANNER.

You are being asked to volunteer to take part in the research project named above.

Purpose:
The purpose of this study is to determine if there is any relationship between listening to soothing music and the respiratory condition of persons diagnosed as having chronic obstructive airway disease, that is bronchitis, emphysema and/or asthma.

Selection criteria:
You are being invited to participate because: 1) you have one of these diseases, 2) you may experience shortness of breath sometimes, 3) you do not use oxygen on exercise or at rest, 4) you are 45 years or older, and 5) because you can speak and read English. Approximately 20 persons will be enrolled in this study.

Standard treatment:
You are being asked to voluntarily participate in this study. If you decide not to participate, your medical and nursing care will not be affected in any way. You have the right to withdraw from the study at any time.

Procedure:
If you agree to participate, you will be asked to agree to the following: you will be requested to attend one session that will take around two hours. During the session, you will be asked to take two walks. During each walk, you will be asked to cover as much distance as possible; however, you can determine your own pace and rest when necessary. Following each six minutes walk, you will rest for 20 minutes. During one rest period you will listen to music. Your pulse and amount of oxygen in your blood will be monitored before and after the periods of rest. Your pulse and the oxygen will be measured by a small

instrument clipped to your finger. In addition, you will be requested to describe your sensation of breathlessness by circling a number that properly represents your feeling at that time. This session will take place in the College of Nursing, at your convenience.

Risks :

You may experience some shortness of breath after walking. You may bring your medication and use it if necessary.

Benefits :

There are no known benefits to you from your participation in this research study.

Confidentiality :

Your name will not be used on any of the documents used in this study. Your case will be assigned a number, and only the number will be used in any future publication of this study. Only the nurse investigator and the research project committee members will have access to the information you provide.

Costs :

There will be no costs to you and you will not be paid for participation in this study.

IN GIVING MY CONSENT BY SIGNING THIS FORM, I AGREE THAT THE METHODS, INCONVENIENCES, RISKS, AND BENEFITS HAVE BEEN EXPLAINED TO ME AND MY QUESTIONS HAVE BEEN ANSWERED. I UNDERSTAND THAT I MAY ASK QUESTIONS AT ANY TIME AND THAT I AM FREE TO WITHDRAW FROM THE PROJECT AT ANY TIME WITHOUT CAUSING BAD FEELINGS OR AFFECTING MY MEDICAL CARE. MY PARTICIPATION IN THIS PROJECT MAY BE ENDED BY THE INVESTIGATOR OR BY THE SPONSOR FOR REASONS THAT WOULD BE EXPLAINED. NEW INFORMATION DEVELOPED DURING THE COURSE OF THIS STUDY WHICH MAY AFFECT MY WILLINGNESS TO CONTINUE IN THIS RESEARCH PROJECT WILL BE GIVEN TO ME AS IT BECOMES AVAILABLE. I UNDERSTAND THAT THIS CONSENT FORM WILL BE FILED IN AN AREA DESIGNATED BY THE HUMAN SUBJECTS COMMITTEE WITH ACCESS RESTRICTED TO THE PRINCIPAL INVESTIGATOR, Souraya Sidani, OR AUTHORIZED REPRESENTATIVE OF THE COLLEGE OF NURSING. I UNDERSTAND THAT I DO NOT GIVE UP ANY OF MY LEGAL RIGHTS BY SIGNING THIS FORM. A COPY OF THIS SIGNED CONSENT FORM WILL BE GIVEN TO ME.

__________________________________ ______________

Subject's Signature Date

__________________________________ ______________

Witness's Signature Date

INVESTIGATOR'S AFFIDAVIT

I have carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who is signing this consent form understands clearly the nature, demands, benefits, and risks involved in his/her participation and his/her signature is legally valid. A medical problem or language or educational barrier has not precluded this understanding.

Signature of Investigator

Date

APPENDIX C

GUIDELINES FOR ASSESSING RESPIRATORY RATE

GUIDELINES FOR ASSESSING RESPIRATORY RATE

Steps to be followed:

- inform subject that his/her pulse is being taken (to avoid voluntary control of breathing)
- place the subject in a comfortable position, usually semi-Fowler's (uncomfortable position influence the ease of respiration; the semi-Fowler's position permits visualization of chest movement)
- place the subject's arm across his/her chest; place investigator's hand directly over the subject's arm, as if counting the pulse
- make sure the subject's chest movements are felt
- begin time frame
- count each respiratory rate for one full minute
- record respiratory rate
- keep the subject comfortable

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APPENDIX D

DEMOGRAPHIC DATA FORM

DEMOGRAPHIC DATA FORM

Serial number : ________

DIRECTIONS: You are kindly requested to fill in the following personal information. As you can see, your name will not appear on this form. Confidentiality will be maintained. If you have any question, do not hesitate to ask. THANK YOU.

I- Demographic Data.

AGE: ______________________

SEX: ______________________

II- Health Status.

1- How long have you had this disease ?

____

2- Do you have other concurrent disease ?

____

3- What do you do to relieve your shortness of breath ?

____

____

4- Do you use an inhaler ?

____

5- When was the last time you used an inhaler ?

____

6- Do you breathe through pursed lips when you are short of breath?

____

Please circle the number that indicates your ethnic background :

1- white	2- black
3- hispanic	4- native american
5- asian	6- other

APPENDIX E

DYSPNEA SCALE

DYSPNEA SCALE

DIRECTIONS: The purpose of this scale is for you to indicate how short of breath you are NOW. The following scale ranges from 0 to 10. After most numbers is a short description of how short of breath you are feeling at this time. Circle the number that best describes the SHORTNESS OF BREATH you feel at the PRESENT TIME. For example, if you do not feel any shortness of breath at this time, you will circle "0". If you feel that your shortness of breath is more than very strong "7" but not very very strong, you might circle "8" or "9".

Please read carefully the expressions and their corresponding numbers. Then circle the number that you believe indicates the severity of shortness of breath you feel at present.

Do not hesitate to ask for more clarification if necessary.

Thank you.

0	nothing at all
0.5	very very weak
1	very weak
2	weak
3	moderate
4	somewhat strong
5	strong
6	
7	very strong
8	
9	
10	very very strong

APPENDIX F

DATA COLLECTION SHEET

DATA COLLECTION SHEET

Serial Number: ______________ Diagnosis: __________________________________ Last 3 FEV_1 ______________________________

1. Treatment Phase

Timing / Variable	Baseline	Pre-test	Treatment Period																				Post-test
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Respiratory Rate																							
Pulse Rate																							
Oxygen Saturation																							
Dyspnea Scale																							

2. Control Phase

Timing / Variable	Baseline	Pre-test	Control Period																				Post-test
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Respiratory Rate																							
Pulse Rate																							
Oxygen Saturation																							
Dyspnea Scale																							

Anecdotal information (collected at the end of the data collection session).

The principal investigator will ask each subject the following six questions and record the subject's response.

Post measurement questions:

- Did you use:

    1- bronchodilator   yes   no

    2- breathing exercise   yes   no

- When did you use it:

    1- during rest period
    2- while listening to music
    3- other

- Was the music familiar?   yes   no

- Did you like the music?   yes   no

- Did you concentrate on listening to music?   yes   no

- Did you imagine something when listening to music?

    yes   no

    If yes, describe what you imagined :

    ____

    ____

APPENDIX G

GUIDELINE FOR APPLYING A PULSE OXIMETER

GUIDELINE FOR APPLYING A PULSE OXIMETER

Steps to be followed:

- explain the procedure and describe the equipment to the subject

- inform the subject that activity or movement may interfere with the readings and that he may have to avoid it

- prepare the equipment:

  * connect the probe to the monitor box
  * plug to electricity source
  * turn on the power switch and allow time for it to warm up

- select proper finger:

  * usually index unless the subject is obese
  * avoid finger with false or long fingernail or with nailpolish (may interfere with readings)

- attach the probe to the selected finger:

  * position the probe parallel to the finger
  * if necessary, position the probe perpendicular to the finger

- wait until the readings stabilize

- note and record the readings

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